Generative artificial intelligence in supply chain and operations management: a capability-based framework for analysis and implementation

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Abstract

This research examines the transformative potential of artificial intelligence (AI) in general and Generative AI (GAI) in particular in supply chain and operations management (SCOM). Through the lens of the resource-based view and based on key AI capabilities such as learning, perception, prediction, interaction, adaptation, and reasoning, we explore how AI and GAI can impact 13 distinct SCOM decision-making areas. These areas include but are not limited to demand forecasting, inventory management, supply chain design, and risk management. With its outcomes, this study provides a comprehensive understanding of AI and GAI's functionality and applications in the SCOM context, offering a practical framework for both practitioners and researchers. The proposed framework systematically identifies where and how AI and GAI can be applied in SCOM, focussing on decision-making enhancement, process optimisation, investment prioritisation, and skills development. Managers can use it as a guidance to evaluate their operational processes and identify areas where AI and GAI can deliver improved efficiency, accuracy, resilience, and overall effectiveness. The research underscores that AI and GAI, with their multifaceted capabilities and applications, open a revolutionary potential and substantial implications for future SCOM practices, innovations, and research.